

**Notice of Allowability**

Application No.

10/667,496

Applicant(s)

IWAO ET AL.

Examiner

Art Unit

Rene Garcia, Jr.

2853

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--*

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS. This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to Amendment Filed on 14 December 2005.2.  The allowed claim(s) is/are 1-15.3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).a)  All    b)  Some\*    c)  None    of the:1.  Certified copies of the priority documents have been received.2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.5.  CORRECTED DRAWINGS (as "replacement sheets") must be submitted.(a)  including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached  
1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.(b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of  
Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

- |  |  |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                 | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____. | 7. <input type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material           | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|  | 9. <input type="checkbox"/> Other _____.   |

***Allowable Subject Matter***

1. Claims 1-15 are allowed.

The following is an examiner's statement of reasons for allowance: The primary reason for the allowance of claim 1 is the inclusion of the limitations being for an inkjet printing apparatus including an actuator controller for supplying a voltage pulse to the actuator to change a state of the actuator from the first state to the second state and then to the first state again so that two separate ink droplets consisting of a main droplet and a satellite droplet smaller than the main droplet are successively ejected through the nozzle, a pulse width  $T_w$  of the voltage pulse during the second state being shorter than a pulse width  $T_{max}$  at which a maximum ejection speed of ink ejected from the nozzle is obtained, wherein the two separate ink droplets are ejected whenever the state of the actuator is changed from the second state to the first state. It is these limitations found in the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 3 is the inclusion of the limitations being for an inkjet printing apparatus including an actuator controller for supplying a voltage pulse to the actuator to change a state of the actuator from the first state to the second state and then to the first state again so that two separate ink droplets consisting of a main droplet and a satellite droplet smaller than the main droplet are successively ejected through the nozzle, the actuator controller controlling a time period  $T_w$  during the second state from a timing  $T_1$  when the actuator starts to change from the first state to the second state, until a timing  $T_2$  when the actuator starts to change from the second state to the first state, to be shorter than a pulse width

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$T_{max}$  at which maximum ejection speed of ink ejected from the nozzle is obtained, wherein the two separate ink droplets are ejected whenever the state of the actuator is changed from the second state to the first state. It is these limitations found in the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 6 is the inclusion of the limitations being for an inkjet printing apparatus including supplying a voltage pulse to the actuator to change a state of the actuator from the first state to the second state and then to the first state again so that two separate ink droplets consisting of a main droplet and a satellite droplet smaller than the main droplet are successively ejected through the nozzle, pulse width  $T_w$  of the voltage pulse during the second state being shorter than a pulse width  $T_{max}$  at which a maximum ejection speed of ink ejected from the nozzle is obtained, wherein the two separate ink droplets are ejected whenever the state of the actuator is changed from the second state to the first state. It is these limitations found in the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 8 is the inclusion of the limitations being for in an inkjet printing apparatus including an actuator controller changing a state of the actuator from the first state to the second state and then to the first state again so that two separate ink droplets consisting of a main droplet and a satellite droplet smaller than the main droplet are successively ejected through the nozzle, actuator controller controlling a time period  $T_w$  during the second state from a timing  $T_1$  when the actuator starts to change from the second state to

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the first state, to be shorter than a pulse width  $T_{max}$  at which a maximum ejection speed of ink ejected from the nozzle is obtained, wherein the two separate ink droplets are ejected whenever the state of the actuator is changed from the second state to the first state. It is these limitations found in the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 11 is the inclusion of the method steps of an inkjet printing apparatus that includes a plurality of pressure chambers each having one end connected to a nozzle, the actuator being able to take two states of a first state wherein the volume of a pressure chamber is  $V_1$ , and a second state wherein the volume of the pressure chamber is  $V_2$  larger than  $V_1$ , a state of the actuator changing from the first state to the second state and then to the first state again so that two separate ink droplets consisting of a main droplet and a satellite droplet smaller than the main droplet are successively ejected through the nozzle, the method comprising a step of supplying a voltage pulse to the actuator, the voltage pulse having a pulse width  $T_w$  during the second state shorter than a pulse width  $T_{max}$  at which a maximum ejection speed of ink ejected from the nozzle is obtained, wherein the two separate ink droplets are ejected whenever the state of the actuator is changed from the second state to the first state. It is these steps found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 13 is the inclusion of the method steps of an inkjet printing apparatus that includes a plurality of pressure chambers each having one end connected to a nozzle, the actuator being able to take two states of a first state wherein the

volume of a pressure chamber is V1, and a second state wherein the volume of the pressure chamber is V2 larger than V1, a state of the actuator changing from the first state to the second state and then to the first state again so that two separate droplets consisting of a main droplet and a satellite droplet smaller than the main droplet are successively ejected through the nozzle, the method comprising a step of controlling a time period Tw during the second state from a timing T1 when the actuator starts to change from the first state to the second state, until a timing T2 when the actuator starts to change from the second state to the first state, to be shorter than a pulse width Tmax at which a maximum ejection speed of ink ejected from the nozzle is obtained, wherein the two separate ink droplets are ejected whenever the state of the actuator is changed from the second state to the first state. It is these steps found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

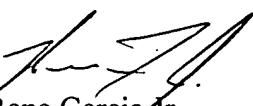
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***Communications with the USPTO***

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rene Garcia, Jr. whose telephone number is (571) 272-5980. The examiner can normally be reached on M-F 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Rene Garcia, Jr  
03 February 2006

  
R. FOGGINS 2/54  
PRIMARY EXAMINER